

**WHAT IS CLAIMED IS:**

- 1     1.     A medical device comprising:  
2             an elongate body having a distal end for entry into a body and positionable  
3     near a target tissue region within the body; and  
4             a structure deployable from the distal end of the elongate body to cool the  
5     target tissue region.
- 1     2.     The medical device of claim 1 wherein the elongate body comprises:  
2             an elongate shaft that has the deployable structure affixed to its distal end;  
3     and  
4             an elongate sleeve that is longitudinally movable with respect to the shaft,  
5     wherein the elongate sleeve, when moved distally, encompasses the deployable  
6     structure.
- 1     3.     The medical device of claim 1 wherein the deployable structure comprises a  
2     patch having a surface shaped to contact the tissue region.
- 1     4.     The medical device of claim 3 wherein the deployable patch has an inner  
2     chamber that receives, from a lumen in the elongate body, a fluid for cooling the  
3     patch surface that contacts the target tissue region.
- 1     5.     The medical device of claim 1 wherein the deployable structure is cup-shaped  
2     and has a periphery for contacting body tissue to form a chamber whose bounds are  
3     defined by the body tissue and an inside surface of the cup-shaped structure.

1     6.     The medical device of claim 1 wherein the deployable structure has an inner  
2     chamber with a Joule-Thompson orifice into the inner chamber so that a liquid  
3     supplied through the elongate body, through the orifice, and into the inner chamber  
4     has a phase change into a gas.

1     7.     The medical device of claim 1 wherein the distal end of the device is  
2     advanceable through a body vessel to the target tissue region when the structure is  
3     in a non-deployed state.

1     8.     The medical device of claim 7 wherein the structure cannot be advanced  
2     through the body vessel when the structure is in a deployed state.

1     9.     The medical device of claim 1 wherein the elongate body further comprises a  
2     proximal end that remains outside the body when the distal end of the elongate body  
3     is positioned near the target tissue region.

1     10.    A medical device comprising:  
2         an elongate body having a distal end for entry into a body and positionable  
3         near a target tissue region within the body;  
4         a patch deployable from the distal end of the elongate shaft to cool the target  
5         tissue region, the patch having a surface shaped to contact the target tissue region.

1     11.    The medical device of claim 10 wherein the patch comprises a collapsible  
2     frame made of a shape memory alloy so that, when deployed, the patch expands to  
3     create the surface that contacts the target tissue region.

1     12.    The medical device of claim 10 wherein the elongate body comprises:

2 an elongate shaft that has the deployable patch affixed to its distal end; and  
3 an elongate sleeve that is longitudinally movable with respect to the shaft,  
4 wherein the elongate sleeve, when moved distally, encompasses the deployable  
5 patch.

1 13. The medical device of claim 12 wherein the patch is deployed from the distal  
2 end of the body by moving the sleeve proximally with respect to the shaft to expose  
3 the patch from the confines of the sleeve.

1 14. The medical device of claim 10 wherein the distal end of the device is  
2 advanceable through a body vessel to the tissue region when the patch is in a non-  
3 deployed state.

1 15. The medical device of claim 14 wherein the distal end of the device is not  
2 advanceable through the body vessel when the patch is in a deployed state.

1 16. The medical device of claim 10 wherein the elongate shaft comprises:  
2 a first lumen to provide fluid to an inner chamber of the patch; and  
3 a second lumen to remove fluid from the inner chamber of the patch.

1 17. The medical device of claim 16 wherein the inner chamber of the patch  
2 comprises a conduit through which fluid flows, the conduit being located adjacent to  
3 the surface of the patch in contact with the target tissue region.

1 18. The medical device of claim 10 further comprising at least one additional  
2 patch deployable from the distal end of the elongate body.

1 19. The medical device of claim 10 wherein the patch comprises a thermoelectric  
2 cooling element positioned adjacent to the surface of the patch and in contact with  
3 the target tissue region that cools the target tissue region.

1 20. The medical device of claim 10 further comprising a balloon positioned  
2 adjacent to a surface of the patch that does not contact the target tissue region, the  
3 balloon providing insulation between the patch and body fluids when the patch is  
4 deployed and positioned near the target tissue region.

1 21. The medical device of claim 20 wherein the elongate body comprises a lumen  
2 to provide the balloon with an inflation medium.

1 22. The medical device of claim 20 further comprising an anchoring mechanism  
2 near the distal end of the elongate shaft that is connectable to tissues inside the  
3 body to anchor the patch when it is deployed near the target tissue area.

1 23. The medical device of claim 10 wherein the patch has an inner chamber with  
2 a Joule-Thompson orifice into the inner chamber so that a liquid supplied through  
3 the elongate shaft, through the orifice, and into the inner chamber has a phase  
4 change into a gas.

1 24. The medical device of claim 10 wherein the patch comprises a temperature  
2 sensor to sense the temperature of the surface of the patch in contact with the target  
3 tissue region.

1 25. A medical device comprising:

2 an elongate body having fluid transfer lumens extending longitudinally  
3 through the shaft to a distal end; and  
4 a cup-shaped structure deployable from the distal end of the body and having  
5 a periphery for contacting body tissue to form a chamber bound by the body tissue  
6 and an inside surface of the cup-shaped structure, the chamber being in fluid  
7 communication with the body fluid transfer lumens to allow fluid to be delivered to  
8 and from the chamber.

1 26. The medical device of claim 25 wherein the cup-shaped structure comprises  
2 a collapsible frame made of a shape memory alloy so that, when deployed, the cup-  
3 shaped structure can expand to take on a cup-shaped configuration.

1 27. The medical device of claim 25 wherein the elongate body comprises:  
2 an elongate shaft that has the deployable structure affixed to its distal end;  
3 and  
4 an elongate sleeve that is longitudinally movable with respect to the shaft,  
5 wherein the elongate sleeve, when moved distally, encompasses the deployable  
6 structure.

1 28. The medical device of claim 27 wherein the cup-shaped structure is deployed  
2 from the distal end of the body by moving the distal end of the sleeve proximally with  
3 respect to the shaft to expose the cup-shaped structure from the confines of the  
4 sleeve.

1 29. The medical device of claim 25 wherein the distal end of the device is  
2 advanceable through a body vessel to the tissue region when the cup-shaped  
3 structure is in a non-deployed state.

1 30. The medical device of claim 29 wherein the distal end of the device is not  
2 advanceable through the body vessel when the cup-shaped structure is in a  
3 deployed state.

1 31. The medical device of claim 25 wherein the periphery of the cup-shaped  
2 structure comprises small holes positioned to contact the body tissue, the holes  
3 securing the periphery of the cup-shaped structure to the body tissue when a  
4 vacuum is applied.

1 32. The device of claim 25 wherein the cup-shaped structure comprises a layered  
2 structure with an inflatable chamber positioned between first and second layers and  
3 inflatable to insulate body fluids from the fluid in the sealed chamber.

1 33. The device of claim 32 wherein the elongate shaft comprises a lumen to  
2 provide the inflatable chamber with an inflation medium.

1 34. The device of claim 25 further comprising a temperature sensor to sense the  
2 temperature of the fluid delivered to and from the chamber.

1 35. A method of cooling a target tissue region inside a body, the method  
2 comprising:

3 introducing into a body vessel a distal portion of a catheter having an  
4 elongate body and a structure deployable from a distal end of the elongate body;

5           positioning the distal portion of the catheter near the target tissue region;  
6           deploying the deployable structure from the elongate body;  
7           placing the deployed structure in contact with the target tissue region; and  
8           cooling the deployed structure to cool the target tissue region.

1    36.    The method of claim 35 wherein the deployable structure comprises a patch  
2    having a surface shaped to contact the tissue region.

1    37.    The method of claim 35 wherein the deployable structure is cup-shaped and  
2    has a periphery for contacting to the body tissue region to form a chamber bound by  
3    the body tissue and an inside surface of the cup.

1    38.    The method of claim 35 wherein the target tissue region is within a chamber  
2    of the heart.

1    39.    The method of claim 38 wherein the deploying of the deployable structure  
2    occurs after the distal end of the catheter is positioned inside the chamber of the  
3    heart.